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10/570,903	03/07/2006	Michinari Miyagawa	KITO5.002APC	1649

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EXAMINER

BARROW, AMANDA J

ART UNIT	PAPER NUMBER
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1795

NOTIFICATION DATE	DELIVERY MODE
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08/10/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/570,903	Applicant(s) MIYAGAWA, MICHINARI	
	Examiner AMANDA BARROW	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 19-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/25/09, 10/4/07 and 3/26/07</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-18, in the reply filed on 6/18/09 is acknowledged. The election is considered to be done without traverse as no arguments were presented. Claims 19-25 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Missing Priority Document

2. Only some of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)). The certified copy of the Foreign Priority Application has not been received and needs to be submitted.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-4, 11, and 15 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements will be explained subsequently. All of these claims depend from claim 1 which recites "at least one of a second layer... and a third resin layer." Therefore, *only one* of the second or third layer needs to be present. Claims 2-4, 11 and 15 all recite that "*each* of the second and third resin layer" meaning that *both* are present. Therefore, either claims 2-4, 11 and 15 need to be amended to recite, "the second *or* third layer,"

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or "at least" needs to be eliminated from claim 1. As the prior art teaches both ways (a second and third resin layer or just a second layer), the present claims will be examined for the first case (both layers are present).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

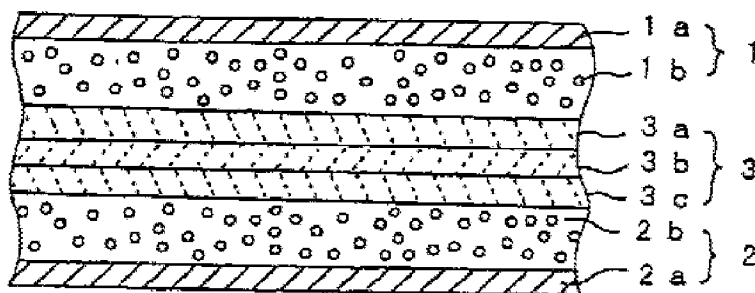
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, 14 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (US Patent Application 2001/0005560 A1).

Regarding claim 1, Yoshida discloses a separator for a battery which has a “resin conductive layer as a mixture of resin and conductive filler” as recited in the claim in which there is a second porous layer 3b (“first layer”) formed in between first and third porous layers 3a, 3c (“second and third layers,” respectively) (paragraphs 22-29) as is illustrated in Figure 2 below:

FIG. 2



Yoshida recites that the second porous layer ("first layer") has a higher heat resistance than that of the first and third layers 3a,3c ("second and third layers," respectively) in which the second porous layer ("first layer") is interposed (paragraph 15). Heat resistance is an equivalent term to volume resistance as both are a measure of how strongly a material opposes the flow of electric current which is usually given in terms of ohms (Ω). Therefore, the first and third layers, 3a,3c ("second and third layers," respectively) have a volume resistance smaller than that of the second porous layer ("first layer") as recited in the claim.

As is illustrated in Figure 2, the first layer 3a ("second layer") constitutes the surface of the resin conductive layer and the third layer 3c ("third layer") forms an interface with the negative electrode which constitutes a negative electrode active material layer 2b and a negative electrode current collector 2a ("metal substrate") (paragraph 22). Yoshida teaches that the components for forming the second porous layer 3b ("first layer") may be an organic powder

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(“conductive filler”) mixed with an organic polymer (“resin”) (paragraph 25) and that the first and third layers 3a, 3c have a thermoplastic resin as a main component (paragraph 29).

Yoshida does not specifically recite that the second layer 3b (“first layer”) has a volume resistance of $1.0\ \Omega\cdot\text{cm}$ or less; however, it is the position of the examiner that the volume resistance is inherent given that the materials disclosed for the second layer 3b (“first layer”) by Yoshida (paragraph 25) and the materials used in the present application are of the same make-up. A reference which is silent about a claimed invention’s features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Additionally, Yoshida notes that the same separator construction as in the embodiments of the present invention may be applied to a battery of a laminated type in which each of positive electrodes and negative electrodes are placed alternatively between a plurality of separators cut into each piece or in which the electrodes are placed alternatively between a winding separator or a folded separator (paragraph 30). Therefore, the separator taught by Yoshida can be used to separate electrodes in multiple formats including the one disclosed in the present application.

Lastly, the claim limitation of the resin conductive layer being formed at least on one side of a metal substrate will be dealt with subsequently. Yoshida shows that the separator 3 is adjacent to a positive electrode which is formed by applying a lithium cobalt oxide to a current collector (paragraph 3). Therefore the resin conductive layer taught by Yoshida is formed at least on one side of a “metal substrate” as lithium cobalt oxide is a metal oxide and current collectors are formed from metal.

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Regarding claim 3, Yoshida does not specifically recite that the first and third layers 3a, 3c have a volume resistance of $0.5 \Omega \cdot \text{cm}$ or less; however, it is the position of the examiner that the volume resistance is inherent given that the materials disclosed for these layers by Yoshida (paragraph 25) and the materials used in the present application are of the same make-up. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Regarding claim 14, Yoshida discloses by way of example that the resin selected is polyvinylidene fluoride (paragraph 33) which is defined as a fluororesin (see Applicant's specification, page 11, second paragraph).

Regarding claims 16-18, Yoshida discloses a separator which has all three layers (please see the rejection of claim 1 for further details).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 2, 4, 5 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US Patent Application 2001/0005560 A1) in view of Ooma et al. (US Patent Application 2003/0162079 A1).

Regarding claim 2, Yoshida does not recite that the first and third layers 3a, 3c ("second and third layers") have a larger content of the organic powder ("conductive filler") (paragraph 25) than the second layer 3b ("first layer"); however, Ooma discloses separators in which the amount of carbonaceous material and thermosetting resin is changed including separators with more carbon than thermosetting resin and vice versa (paragraph 75). Ooma discloses that the results of this are that varying the different amounts of carbonaceous material and resin results in separators of different weights, gas permeability, peeling rates and obviously conductivity (paragraph 81).

Applying a known technique to a known device ready for improvement to yield predictable results is likely to be obvious. See *KSR International Co. v. Teleflex Inc.*, 550 U.S., 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, D.). Therefore, it would be obvious to a person of ordinary skill in the art to arrange the resin conductive layers with varying carbon and resin amounts as disclosed by Ooma to the separator of Yoshida in order to optimize the weight, gas permeability, peeling rates and conductivity of the resin conductive mixture.

Regarding claims 4 and 5, Yoshida fails to describe the specific percentage of organic powder ("conductive filler") and resin used in the layers; however, Ooma discloses separators in which the amount of carbonaceous material and thermosetting resin is changed including

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separators with more carbon than thermosetting resin and vice versa (paragraph 75). Ooma discloses that the results of this are that varying the different amounts of carbonaceous material and resin results in separators of different weights, gas permeability, peeling rates and obviously conductivity (paragraph 81).

The discovery of an optimum value of a known result effective variable, without producing any new or unexpected results, is within the ambit of a person of ordinary skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980) (see MPEP § 2144.05, II.). Therefore, it would be obvious to a person of ordinary skill in the art to modify the ratio of carbon to resin as this produces the known result of changing the weight, gas permeability, peeling rates and conductivity of the separator (Ooma - paragraph 81).

Regarding claims 9-11, Yoshida discloses that the that an organic powder (“conductive filler”) can be mixed with a polymer, but does not disclose the specifics of the organic powder ("conductive filler"); however Ooma discloses that the carbonaceous material used in the carbon resin composite material of the separator is a mixture of graphite powder and carbonaceous fibers (paragraph 75). If one applies the carbon resin composite materials of Ooma to Yoshida, these could easily be placed in the first and third layers 3a, 3c ("second and third layers") so that they contain the carbonaceous fibers. The motivational statements for the combination of the Yoshida and Ooma references were previously recited in the rejection of claim 2.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US Patent Application 2001/0005560 A1) in view of Ooma et al. (US Patent Application

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2003/0162079 A1) as applied to claims 2, 4, 5 and 9-11, and further in view of Takano et al. (US Patent 6,544,680 B1).

Regarding claim 12, Yoshida does not teach that the organic powder (“conductive filler”) used in the resin layers contains carbon fibers; however Ooma does (paragraph 75). Ooma does not disclose the diameter and length of the fiber to be used; however, Takano discloses a fuel cell separator which uses fine carbon fibers having an average diameter of not more than 2 μm and an average length of not more than 500 μm (column 17, lines 4-7).

The selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07). Additionally, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d.257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); *In re Geisler*, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed Cir. 1997). See MPEP 2144.05. Therefore, it was known in the art to use fibers of this diameter and length in separators as disclosed by Takano.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US Patent Application 2001/0005560 A1) in view of Ooma et al. (US Patent Application 2003/0162079 A1), and further in view of Kitade (US Patent Application 2003/0129471 A1).

Regarding claim 13, Yoshida does not teach that the organic powder (“conductive filler”) used in the resin layers contains carbon black; however Kitade discloses that it is known in the art to use carbon black as the conductive material in a separator (claim 18).

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The selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07). Therefore, it would be obvious to a person of ordinary skill in the art to use carbon black as the conductive filler as taught by Kitade in the separator of Yoshida.

10. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US Patent Application 2001/0005560 A1) in view of Takao et al. (US Patent Application 2002/0160248 A1).

Regarding claims 6, 7 and 8, Yoshida does not disclose the type of material that the current collector (“metal substrate”) is made out of, that it is plated with a metal or if it has a roughened surface; however, Takao discloses that a stainless steel separator having surfaces with fine unevenness or roughness has a significant decrease in contact resistance with the addition of silver to the steel separator (paragraph 42). Also, in Applicant's specification there is admitted prior art on the metal substrate: "There has been investigated a material prepared by coating the surface of a highly processable metal material, as a constituent for a separator, with a noble metal material such as gold having corrosion resistance (page 2, paragraph 4).

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The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR International Co. v. Teleflex Inc.*, 550 U.S., 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.). Therefore, as Yoshida teaches all of the layers in the resin conductive layer claimed and notes that it can be used as a separator between alternating electrodes, it would be obvious to take the resin conductive layer of Yoshida and apply it to the base separator of Takao made of roughened stainless steel coated with silver as this would decrease contact resistance.

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (US Patent Application 2001/0005560 A1) in view of Yamashita et al. (US Patent 6,287,720 B1).

Regarding claim 15, Yoshida does not disclose the specific thickness of the resin layers; however, Yamashita discloses that a separator which has a preferable thickness from 5 nm to 100 μm (column 7, lines 47-51).

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In *re* Wertheim, 541 F.2d.257, 191 USPQ 90 (CCPA 1976); *In re* Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); *In re* Geisler, 116 F.3d 1465, 1469-71, 43 USPQ2d 1362, 1365-66 (Fed Circ. 1997). See MPEP 2144.05. Therefore, as the claimed ranges of the present application overlap and/or lie inside the range taught by Yamashita, a prima facie case of obviousness exists. Additionally, it would be obvious to a person of ordinary skill in the art to adapt the ranges taught by Yamashita to the separator of

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Yoshida as this range provides for a low weight separator with high mechanical strength (Yamashita - column 12, lines 9-61).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMANDA BARROW whose telephone number is (571)270-7867. The examiner can normally be reached on 7:30am-5pm EST. Monday-Friday, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sines can be reached on 571-272-1263. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AMANDA BARROW/
Examiner, Art Unit 1795

/Brian J. Sines/
Supervisory Patent Examiner, Art Unit 1795